

Claims

1. A method of managing time for a controller located in a processing system on a machine, the processing system including a plurality of controllers, each controller having a local clock, and a communication network connecting each of the controllers, including the steps of:

10            establishing an operating characteristic of the machine;

             determining whether to update a local time in response to said operating characteristic; and

             updating said local time using the local clock in response to said update determination.

2. A method, as set forth in claim 1, further comprising the steps of:

20            receiving an official time;

             determining a difference between said official time and said local time; and,

             determining whether to synchronize said local time with said official time in response to said time difference.

3. A method, as set forth in claim 2, wherein the step of establishing said operating characteristic further comprises the step of receiving an operating characteristic, said operating

characteristic being indicative of the machine being operated.

4. A method, as set forth in claim 2,  
5 wherein the step of establishing said operating  
characteristic further comprises the step of receiving  
an operating characteristic, said operating  
characteristic being indicative of the engine being  
operated.

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5. A method, as set forth in claim 2,  
wherein the step of determining whether to synchronize  
said local time further comprises the step of  
determining to synchronize said local time with said  
15 official time in response to said time difference  
being greater than a first threshold.

6. A method, as set forth in claim 5,  
further comprising the step of establishing a master  
20 controller of the processing system.

7. A method, as set forth in claim 6,  
wherein the step of receiving said official time  
further comprises the step of receiving said official  
25 time from said master controller.

8. A method, as set forth in claim 7,  
wherein the step of establishing said operating  
characteristic further comprises the step of receiving

an operating characteristic signal from said master controller.

9. A method, as set forth in claim 6,  
5 wherein the step of establishing said master controller further comprises the step of participating in an arbitration process among the controllers.

10. A method, as set forth in claim 9,  
10 further comprising the step of receiving an arbitration signal.

11. A method, as set forth in claim 10,  
generating a priority signal in response to receiving  
15 said arbitration signal, said priority signal being indicative of at least one controller characteristic.

12. A method, as set forth in claim 11,  
further comprising the steps of:  
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receiving at least one priority signal;  
determining whether to become the master controller in response to said received at least one priority signal.

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13. A method, as set forth in claim 10,  
further comprising the step of initiating said arbitration process in response to receiving power.

14. A method, as set forth in claim 10,  
wherein the step of initiating said arbitration  
further comprises the step of initiating said  
arbitration process in response to failing to receive  
5 one of said official time and said operating  
characteristic.

15. An apparatus configured to manage time  
on a processing system located on a machine,  
10 comprising:

a plurality of controllers;  
a local clock located on each controller and  
configured to establish a local time;  
15 a communication network connected to said  
controllers; and

wherein each of said plurality of  
controllers is configured to establish an operating  
characteristic of the machine, determine whether to  
20 update said local time, using said local clock, in  
response to said operating characteristic, and  
updating said local time in response to said update  
determination.

25 16. An apparatus, as set forth in claim 15,  
wherein said plurality of controllers being further  
adapted to establish a master controller in response  
to an arbitration process, the remaining controllers  
being non-master controllers.

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17. An apparatus, as set forth in claim 16, wherein each of said non-master controllers receives an official time signal from said master controller.

5           18. An apparatus, as set forth in claim 17, wherein each of said non-master controllers is further adapted to determine a difference between said official time and said local time and determine whether to synchronize said local time with said  
10 official time in response to said time difference.

19. An apparatus, as set forth in claim 18, wherein each of said non-master controllers receives an operating characteristic signal, indicative of said  
15 operating characteristic, from said master controller.

20. An apparatus, as set forth in claim 19, wherein said operating characteristic is indicative of at least one of a machine operation and an engine  
20 operation.

21. An apparatus, as set forth in claim 20, wherein each of said non-master controllers is further adapted to synchronize said local time with said  
25 official time in response to said difference being greater than a first threshold.

22. An apparatus, as set forth in claim 21, wherein at least one of said non-master controllers  
30 initiates said arbitration in response to failing to

receive one of said official time signal and said operating characteristic signal.

23. An apparatus, as set forth in claim 22,  
5 wherein each said non-master controller generates a priority signal indicative of said controllers capability.

24. An apparatus, as set forth in claim 23,  
10 wherein each said non-master controller is further adapted to determine whether to be the master controller in response to receiving said priority signals.

25. A method of managing time for a  
15 processing system located on a machine, the processing system including a plurality of controllers, each controller having a local clock, and a communication network connecting each of the controllers, including  
20 the steps of:

establishing an operating characteristic of the machine;

determining whether to update a local time  
25 on each of the controllers in response to said operating characteristic; and

updating said local time, using the local clock, in response to said update determination.

26. A method, as set forth in claim 25,  
further comprising the steps of:

5           establishing an official time;  
          determining a difference between said  
official time and said local time; and,  
          determining whether to synchronize said  
local time with said official time in response to said  
time difference.

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27. A method, as set forth in claim 26,  
further comprising the step of establishing a master  
controller, the other controllers being non-master  
controllers.

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28. A method, as set forth in claim 27,  
wherein the step of establishing said operating  
characteristic further comprises the step of  
delivering an operating characteristic to each of the  
20 non-master controllers, said operating characteristic  
being indicative of the machine being operated.

29. A method, as set forth in claim 27,  
wherein the step of establishing said operating  
25 characteristic further comprises the step of  
delivering an operating characteristic signal to each  
of the non-master controllers, said operating  
characteristic being indicative of the engine being  
operated.

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30. A method, as set forth in claim 27,  
wherein the step of determining whether to synchronize  
said local time further comprises the step of  
synchronizing said local time with said official time  
5 in response to said time difference being greater than  
a first threshold.

31. A method, as set forth in claim 30,  
wherein the step of receiving said official time  
10 further comprises the step of receiving said official  
time from said master controller.

32. A method, as set forth in claim 31,  
wherein the step of establishing said operating  
15 characteristic further comprises the step of receiving  
an operating characteristic signal from said master  
controller.

33. A method, as set forth in claim 32,  
20 wherein the step of establishing said master  
controller further comprises the step of arbitrating  
among the controllers.

34. A method, as set forth in claim 33,  
25 wherein the step of arbitrating further comprises the  
steps of:

at least one of the controllers initiating  
said arbitration; and

30 (said at least one controller generating an  
arbitration signal in response to said initiation.



35. A method, as set forth in claim 34,  
further comprising the step of generating a priority  
signal in response to receiving said arbitration  
5 signal, said priority signal being indicative of at  
least one controller characteristic.

36. A method, as set forth in claim 35,  
further comprising the steps of:

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receiving said priority signals;  
determining whether to become the master  
controller in response to said received priority  
signals.

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37. A method, as set forth in claim 36,  
wherein the step of initiating said arbitration  
further comprises the step of initiating said  
arbitration process in response to receiving power.

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38. A method, as set forth in claim 37,  
wherein the step of initiating said arbitration  
further comprises the step of initiating said  
arbitration process in response to failing to receive  
25 one of said official time and said operating  
characteristic.